52C3d
MARCH 1, 1943

SUPERSEDING
52C3b
July 1, 1940
52C3c
July 1, 1942

NAVY DEPARTMENT SPECIFICATION

CEMENT, RUBBER

A. APPLICABLE SPECIFICATIONS.

A–1. The following Navy Department specifications, of the issue in effect on date of invitation for bids, form a part of this specification, and bidders and contractors should provide themselves with the necessary copies:

General Specifications for Inspection of Material.
33R1—Rubber, Synthetic: Sheets, Strips, Packing, and Gaskets.
53B11—Boxes, Fiberboard, Corrugated and Solid.

B. GRADE.

B–1. Rubber cement covered by this specification shall be of but one grade.

C. MATERIAL AND WORKMANSHIP.

C–1. See section E.

D. GENERAL REQUIREMENTS.

D–1. See section E.

E. DETAIL REQUIREMENTS.

E–1. The cement shall be of the best commercial quality, ready for use, shall have no deleterious effect upon rubber to which applied, and shall not deteriorate when enclosed in airtight metal containers.

E–2. *Solids content.*—The cement shall have a total solids content of 0.5 percent when determined by the method described in paragraph F–1.

E–3. *Viscosity.*—The cement shall have a viscosity as provided by table I, when determined by the method described in paragraph F–2, using the apparatus illustrated by figure 1.

E–4. *Tensile strength.*—The average tensile strength of the six test specimens, prepared as provided by paragraph F–3, shall be at least 100 pounds. None of the six test specimens shall show a tensile strength of less than 75 pounds.

507704—43

F. METHODS OF SAMPLING, INSPECTION, AND TESTS.

F–1. *Determination of solids content.*—The total solids content shall be determined as follows:

Approximately 10 gm. of the cement shall be placed in a low-form weighing bottle, 60 mm. wide by 30 mm. high. The bottle shall be covered and weighed. The cover shall be removed and all solvent evaporated at 70° C. (approximately 4 hours required.) The bottle shall then be placed in a desiccator to cool and shall then be weighed.

$$\text{Percentage of total solids} = \frac{\text{weight of residue}}{\text{weight of sample}} \times 100.$$

F–2. *Viscosity (by the falling-cylinder method).*

F–2a. *Apparatus.*—The apparatus used shall be as illustrated by figure 1. The container for the test sample of rubber cement shall be a corrosion-resistant steel cylindrical vessel 10 cm. in diameter and 20 cm. deep, within a plus or minus tolerance of 1 percent. The viscosimeter cylinder shall be made of metal and shall be 0.081 cm. in diameter, 21 cm. long, and shall weigh 0.3059 gm., within a plus or minus tolerance of 1 percent. A reference mark shall be placed on the cylinder 5 cm. from one end and a second mark 20 cm. from the same end. These marks shall be made with waterproof drawing ink, covered with lacquer. A smooth guide, through which the viscosimeter cylinder shall fall, shall be supported over the container, which shall rest on a base plate. The base plate shall be integral with the upright supporting the guide. The position of the guide shall be adjustable by means of a clamp, and the container shall be capable of being raised or lowered in a vertical direction by means of a micrometer screw on the base-plate support. This guide shall be equipped with a quick-release mechanism which will allow the cylinder to fall freely without appreciable friction. The top of the guide shall serve as a reference point for the reference marks on the cylinder. In the tests the bottom tip of the cylinder shall be used as an elevation gage or standard to which the surface level of the rubber cement shall be brought by means of the adjusting screw.

F–2b. *Method of test.*—The cylindrical container shall be filled with cement to within ½ inch of the top. The temperature of the test sample shall be noted. The test temperature range shall be from 20° to 27° C. (68° to 80.6° F.). Then the cylinder guide shall be moved over the container and lowered with the viscosimeter cylinder in place, that is, in the orifice of the guide, with the lower end of the cylinder just touching the surface of the cement, and the lower mark (5 cm.) on the cylinder coinciding with the top of the guide. Following these adjustments, the cylinder, held perpendicularly, shall be released, and the time to travel the 15 cm. to the upper cylinder mark shall be taken with a stop watch. Care shall be exercised to prevent smearing the guide with the cement when the cylinder is being removed. Two separate runs, each involving two determinations of viscosity, shall be made on the test sample.

F–2c. The time of fall, in seconds, shall be within the range shown in table I for any given temperature.

TABLE I.— *Time required for viscosimeter cylinder to travel 15 cm.*

Temperature of sample		Time		
		Average	Range	
			Maximum	Minimum
° C.	° F.	Seconds	Seconds	Seconds
20	68.0	35	38	32
21	69.8	34	37	31
22	71.6	33	36	30
23	73.4	32	35	29
24	75.2	31	34	28
25	77.0	30	33	27
26	78.8	29	32	26
27	80.6	28	31	25

F–3. *Method of determining tensile strength.*—

F–3a. The strength of rubber cement shall be determined by test, at room temperature, on six test specimens, made of rubber conforming to Navy Department Specification 33R1, listed in section A.

F–3b. Two specimens of rubber gasket, 1-inch cube, with a hole drilled through the center of two opposite faces for the insertion of a ½-inch pin, and with surfaces buffed clean and thoroughly cleansed with benzol, shall each be coated on one side with cement and allowed to stand for 15 minutes.

F–3c. A second coat shall then be applied, after which the specimens shall be allowed to dry for 1 hour.

F–3d. The two specimens shall then be carefully pressed together with the cemented surfaces in contact. A 10-pound weight shall be placed on them and allowed to remain for 24 hours.

F–3e. The test specimens shall be pulled to rupture at the rate of 20 inches per minute in a tensile-testing machine, when secured in holders as illustrated by figure 2.

G. PACKAGING, PACKING, AND MARKING FOR SHIPMENT.

G–1. *Packaging.*—Unless otherwise specified, rubber cement shall be packaged in 1-quart screw-top or friction-top cans.

G–2. *Packing.*—Unless otherwise specified, the subject commodity shall be packed, twelve 1-quart cans in a weatherproof fiberboard box complying with Navy Department Specification 53B11. Box construction shall be style R. S. C., type SF, grade 3. All flaps shall be wire-stitched, or glued by the application of a water-resistant adhesive applied to the entire area of all flaps, or a combination of both may be used. Boxes shall be reinforced with two steel straps (flat or round), completely encircling the box and placed at right angles to each other.

G–3. *Marking.*—

G–3a. *One-quart cans.*—Unless otherwise specified, each can shall be plainly marked with the name of the material and the quantity contained therein, as defined by the contract or order under which shipment is made, and the name or trade-mark of the manufacturer.

G–3b. *Shipping containers.*—Unless otherwise specified, shipping containers shall be marked with the name of the material and the quantity contained therein, as defined by the contract or order under which shipment is made, the name of the contractor, the number of the contract or order, and the gross weight.

H. NOTES.

H–1. Requests, requisitions, schedules, and contracts or orders must contain the title of the specification, the number, and date.

H–2. Bids for furnishing rubber cement differing from the requirements of this specification will be considered, provided the bid clearly describes the specific points in which the rubber cement proposed differs from the requirements of this specification and provided, further, that the differences are indicated as such. When exceptions are not clearly described and indicated as such, it will be assumed that bidders are offering rubber cement in strict accordance with the requirements of this specification.

H–3. Copies of Navy Department specifications may be obtained upon application to the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., except that Naval activities should make application to the Commandant, Navy Yard, New York, N. Y. When requesting, refer to specification by both title and number.

SHOSY.

[52C3d]

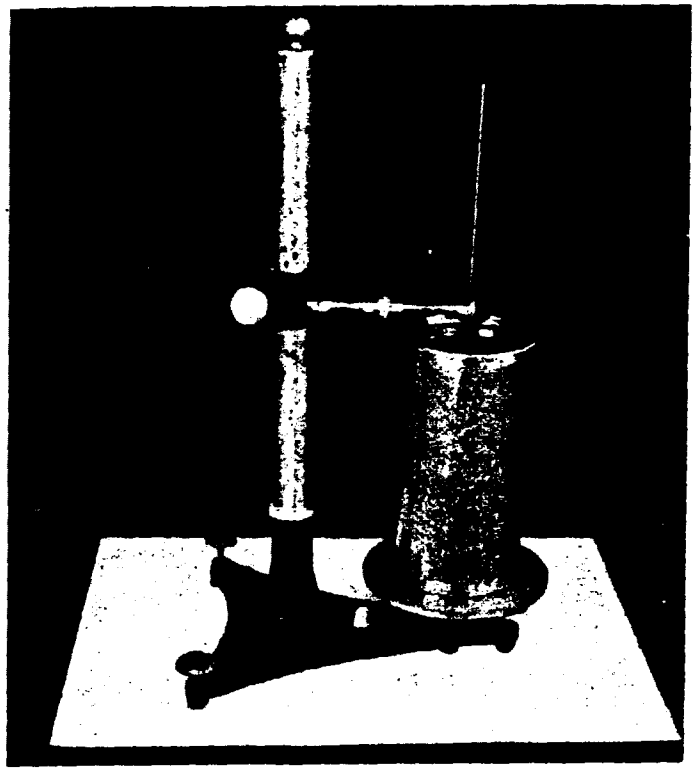

FIGURE 1.—Viscosimeter apparatus, falling-cylinder method.

[52C3d]

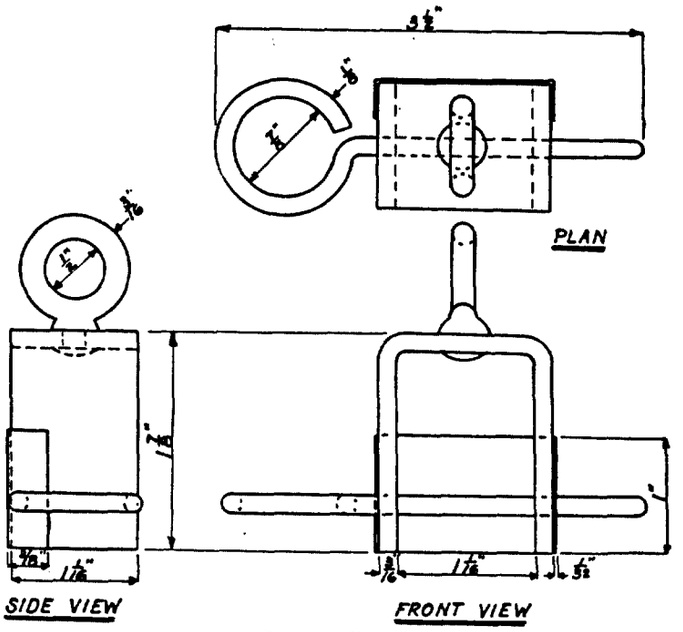

FIGURE 2.—Holders.

[52C3d]

U. S. GOVERNMENT PRINTING OFFICE: 1943